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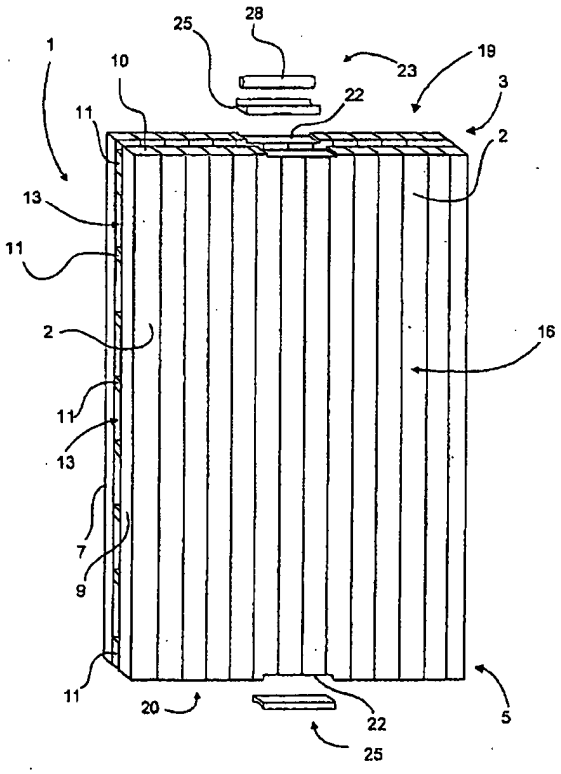

(57) Abstract: Bearing wall element made of wood with an upper and a lower end (3, 5), which wall element (1) consists of joined together wooden elements (2) standing vertically with their grain direction and forming at least a first and a second panel (7, 9) with a side plane, which panels are interconnected by means of horizontal beams (11) extending along the side plane of the panel at a distance from one another in the vertical direction. The wooden elements (2) have exposed end wood (10) at the upper and lower ends (3, 5) of the wall elements (1).

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A wall element

The present invention relates to a wall element according to the precharacterizing clause of Patent Claim 1. The invention can be assigned but is not limited to the construction industry. This application is concurrent with Swedish patent application no. 0000412-7.

Wall elements made of wood are used in the construction of wooden houses. In the factory, frame units, such as wall elements, joist floor elements etc., are prepared, after which these are transported to the building site for assembly. Development over the last century has been aimed at increasingly light constructions. During recent decades, the constructions have been made up of wooden studs and thin panel material in order to reduce the use of timber of good construction quality. These constructions are moreover weak in some cases and have to be supplemented with supporting arrangements, light insulation, wind protection arrangements etc.

Heavier wooden constructions have in recent times become more common within the wooden house construction industry. These solid constructions are considered to provide a better indoor climate by virtue of the fact that they have the effect of evening out heat and moisture variations. In spite of this knowledge, no satisfactory constructions have appeared on the market which are economically viable, satisfy thermal and sound insulation requirements, have sufficient strength etc.

Document DE U1 9112768.8 discloses a construction in which the frame unit consists of vertical timber, forming what is known as a solid wood construction. These constructions according to the known art generally suffer from the disadvantage that impact sound is propagated between floors and that the capacity for moisture buffering and heat storage is not satisfactory.

The construction described in the abovementioned document also suffers from the disadvantage, when it is arranged so as to constitute walls in a building, that the building itself has a tendency to settle when drying takes place and under great loads. Great loads arise in buildings with many floors, in which connection a supporting frame has to be incorporated into the building with wall elements according to the known art. Likewise, the construction according to the known art is associated with difficulties in achieving satisfactory results as far as paper-hanging and other surface finishing are concerned.

The object of the present invention is to produce a wall element made of wood which reduces the occurrence of impact sound.

Another object of the invention is to produce a wall element made of wood, which wall element brings about good sound insulation.

A further object of the invention is to produce a wall element made of wood, which has as few components as possible.

The object of the present invention is also to produce a wall element made of wood which has good resistance to load and moisture variations.

The object is also to produce a wall element made of wood, which acts in a moisture and heat-storing manner.

A further object of the invention is to produce a wall element made of wood which, together with joist floor elements, acts in a moisture and heat-storing manner.

Still another object of the invention is to produce a wall element made of wood which, forming a wall, constitutes a part of a floor of a building, the lower and/or upper end of at least two wall elements having contact surfaces, which provide guidance for assembly and are self-centring after assembly, for sound-insulating connection devices, for example the device described in the abovementioned concurrent Swedish patent application.

The object of the present invention is also to produce a wall element made of wood which, for interior and exterior arrangement, allows suitable contact surfaces of a building.

The object is also to produce a building with at least two floors, which building has heat-storing and moisture-buffering properties and has good sound insulation between floors so as to make possible a good indoor environment and low running costs with regard to heating the finished building.

The object of the invention is also to produce a building which is easy to assemble and maintain so as thus to reduce the costs.

This is achieved by a wall element of the type indicated in the introduction, in which wooden elements have exposed end wood at the upper and lower ends of the wall elements, and the bearing timber is vertical.

Further solutions for achieving the aim of the invention and further characteristics of the invention are indicated in the other patent claims.

The invention means that a wall element has been produced which comprises few components or which has horizontal beams, which otherwise have a tendency to transmit impact sound. The invention also means that the wall element according to the invention has good strength and is resistant to temperature changes and changes in the degree of moisture. This means that the building, which is constructed from the bearing wall elements according to the invention, is not prone to settlement. This is achieved by virtue of the

fact that the wall element according to the invention has no horizontal timber which is bearing. Timber means, for example, an extended batten with the grain direction along the extent of the batten.

The invention also means that the gap-shaped channel between the panels acts in a moisture-buffering and heat-storing manner. This is achieved by virtue of the fact that stationary air is enclosed by the horizontal beams and the panels with a dimensional relationship between the width of the gap, that is to say the distance between the panels, and the height of the gap, that is to say the distance between the beams, which has a good effect.

The invention also means that the surface finishing of the sides/side of the wall element, for interior and exterior arrangement, is simplified and can be carried out more inexpensively than in the case of construction according to the known art. As far as the interior is concerned, the surface can be unfinished, painted, provided with plaster-board panels for paper-hanging etc. There is no unevenness to render the surface finishing more expensive. By coating with plaster, internal visible wood surfaces in apartments and stairwells can limit fire and also safeguard evacuation routes.

The invention moreover means that impact dampers, consisting of connection devices, can be arranged between two wall elements standing one on the other. The contact surface(s) provided for this purpose receive said connection devices (advantageously use is made of the connection device described in the concurrent patent application), so that impact sound between wall elements standing one on the other is damped with satisfactory results. These connection devices are received by said contact surfaces.

The contact surface is advantageously arranged centrally in the upper and lower ends of the wall elements. The wall elements are thus automatically fitted into one another during mounting of, for example, one wall element on another. The connection devices therefore on the one hand act in a self-centring manner during assembly and on the other hand hold the elements in place in the lateral direction. The wall elements can also form a box unit, the mounting of one box unit on another being rendered easier on account of this self-centring function. Other positioning locations of the contact surface and the connection devices placed there are of course possible, according to the size of the static load taken up by the wall elements.

The invention also means that a building with at least two floors can be erected in a rapid and simple manner, which saves on costs. Likewise, transport of the wall elements is made easier, because they can be packed easily and according to a uniform standard. The invention also means that

box units, consisting of a number of wall elements, can be transported from a factory to the building site.

The invention also means that a building is produced, in which impact sound is damped in a satisfactory manner between floors. This means that the living environment in buildings according to the invention is improved considerably, compared with the known art. The demand for living in environmentally friendly houses has increased in recent times. This results in higher property values and building values, at the same time as the wood industry is supported in a positive way. Wood is after all a renewable natural product and the use of this material does not contribute to the greenhouse effect.

The invention moreover means that a floor/a room has been produced which, by means of moisture-buffering or heat-storing wall elements and joist floor elements, results in, for example, the possibility of reducing ventilation during the time the apartments stand empty. The indoor climate is therefore affected in a positive manner, which affords significant energy and power advantages. This is very favourable in terms of cost in comparison with traditional buildings.

Furthermore, the invention means that heavy insulation can be erected on the outer side of the building. Light insulation does not have to be used, because the wall elements with the vertical timber according to the invention have high loadability and heavier insulation can be used. This has a favourable effect on the production of the building in terms of cost, because it is easier to handle heavier insulation and no support members are necessary.

Moreover, the attachment of various types of outer panelling, such as horizontal or vertical boarding, plaster etc., by means of attachment devices which hold the insulation in place during mounting is simplified. This is favourable in terms of cost. Heavy insulation also has a better insulating capacity than light insulation.

The object is also to produce a building or the like with at least two floors which is easy to assemble and disassemble in order thus to save building costs.

This is achieved by virtue of the fact that the wall elements are assembled at the factory and are provided with connection devices according to the invention. Furthermore, the wall elements themselves can be joined together to form wall units or box units. These are transported to the building site, where they are assembled to form a building.

Using such a procedure, a rapid and simple way of erecting a building

with at least two floors is achieved. This results in reduced costs, because the assembly of the wall elements/box units can be carried out rationally at the factory and/or building site, after which these can be mounted simply next to and on one another according to the invention, for the construction of, for example, a five-storey house made of wood.

The invention will be described in greater detail in the form of illustrative embodiments with reference to the accompanying figures, in which

Fig. 1 shows diagrammatically a perspective view of a wall element according to a first embodiment of the invention,

Fig. 2 shows diagrammatically an exploded view of a part of a wall consisting of assembled wall elements from Fig. 1 and connection devices,

Fig. 3 shows diagrammatically a section through two interconnected wall elements from Fig. 1, which are also connected to a joist floor element according to the invention,

Figs 4a-4b show diagrammatically two different building methods for positioning box units and, respectively, assembled wall elements in a building,

Fig. 5 shows diagrammatically a part of a corner of a building in perspective according to the invention, and

Fig. 6 shows diagrammatically a perspective view of a wall element according to a second embodiment of the invention.

Words such as upwards, downwards, vertically, horizontally etc. indicate directions and planes which describe the orientation of what is shown in the drawing, where what is shown has such an orientation as is usual in buildings when these are erected for use.

Fig. 1 shows a wall element 1 made of wood with an upper and a lower end 3, 5 according to a first embodiment of the invention. The wall element 1 consists of joined together vertical wooden elements 2. These wooden elements 2 can consist of timber of the type which is sawn in sawmills etc. on a large scale today. The grain direction of the timber is therefore oriented vertically.

The wall element 1 consists of a first and a second panel 7, 9 with a side plane. Each panel 7, 9 consists of said wooden elements 2 joined together with one another. The joining together can be effected by means of gluing or nailing or other mechanical joining together. The panels 7, 9 are interconnected by means of beams 11. These are arranged horizontally between the panels 7, 9, so that the panels 7, 9 form an interspace. The distance between the beams 11 in the vertical direction is such that gap-

shaped channels 13 are formed between the panels.

The wooden elements 2, the vertical timber, has exposed end wood 10 at the upper and lower ends 3, 5 of the wall elements 1. End wood 10 means that surface of a wooden element 2, such as a batten, which has its plane transverse to the grain direction in said batten. The battens therefore extend continuously all the way from an upper to a lower end edge 19, 20. These end edges 19, 20 comprise contact surfaces 22 for connection devices 23. It is suitable to treat the surface of the end wood 10 with paint or the like in order to prevent drying out. In multi-storey buildings, the wall elements 1 are arranged one on another. Up to five storeys can be produced by means of the wall elements 1 according to the invention.

By virtue of the fact that the wall element 1 according to the invention does not have any horizontal timber which takes up bearing forces, and on account of the fact that wood moves insignificantly in the direction along the grain, the building does not undergo settlement.

The wall element 1 according to the invention is suitably joined together at the factory, moisture damage being avoided and the work being simplified. The wall elements 1 can also be joined together to form box units 15 (see Fig. 4a) and wall units 12 (see Figs 2 and 4b) at the factory. The joining together is effected by means of bolting using bolts (not shown). The space between the panels 7, 9 and the beams 11 therefore forms said gap-shaped channels 13. These are essentially airtight so as to bring about air gaps with stationary air. By means of these air gaps, the gap-shaped channels 13, good heat storage and moisture buffering of the wall elements 1 is achieved in a building according to the invention. The gap-shaped channels 13 can extend over a distance which corresponds to a number of wall elements 1 standing next to one another. The distance between the panels is 10-50 mm, preferably 22-40 mm. The distance between the beams in the vertical direction is 200-500 mm, preferably 250-350 mm. The applicant has arrived at this relationship after applied experiments and evaluation. The gap-shaped channels 13 can also be used for running wiring etc. The panels 7, 9 according to the first embodiment have smooth surfaces. Surface finishing 17 (see Fig. 5) can be brought about directly on these smooth surfaces 16. An unfinished smooth wooden surface likewise constitutes a good interior finish. However, an inner boarding element 46, such as a panel, can be arranged on the wall element 1 according to the invention, which will be shown in greater detail in connection with the description of Fig. 3.

The inside of the panels 7, 9, that is to say the side plane 18 which faces inwards towards the gap-shaped channels 13, is covered with a

reflecting material (r) (see Fig. 3) so as further to increase the heat storage capacity. One advantage of the invention is that insulating material does not have to be used between the panels 7, 9 owing to the fact that the air between them is stationary and thus has a heat-storing and moisture-buffering effect. The panels 7, 9 have an upper and a lower end edge 19, 20. In Fig. 1, these each have a contact surface 22 for a sound-insulating connection device 23. The connection device 23 comprises two receiving members 25. Each receiving member 25 can be arranged against the respective contact surface 22 by means of gluing.

In Fig. 1, one contact surface 22 is shown on each end edge 19, 20 of the wall element 1. The number of contact surfaces 22 can be greater, as in another embodiment of the wall element 1 according to the invention. This is shown in Fig. 6. This is advantageous when the wall element 1 is positioned on the lower floors in a building. The connection device 23 is described in greater detail in the abovementioned concurrent Swedish patent application. The connection device 23 is designed to have a sound-insulating effect and to damp impact sound. The connection device 23 can also be designed so as to guide one wall element 1 in relation to another during mounting of these one on the other and also to act in a self-centring manner after mounting. According to the invention, the contact surface 22 is positioned in such a manner that the wall elements 1 can be mounted with an inner side outwards if so desired, without any negative effect on the guidance of one wall element 1 in relation to another. This also simplifies the mounting of one box unit 15 in relation to another. If the positioning of the connection device 23 of each wall element 1 is such that the positioning of the contact surfaces 22 is such that the distance between these is uniform and does not deviate from a standard, assembly work can be simplified considerably, which is also favourable in terms of cost.

Fig. 2 shows diagrammatically an exploded view of a part of an outer wall consisting of assembled wall elements 1 from Fig. 1. Other structural parts also interact with the wall units 12 shown in the figure, of course, but such structural parts are not shown for the sake of the clarity of the figure. Wall elements 1 according to the invention are joined together at the factory to form wall units 12 each having a cutout for a window 26. The joining together can be effected in a traditional manner, by means of nailing, screwing etc. On the building site, the wall units 12 are arranged on one another, the connection devices 23 interconnecting the wall elements 1 in the vertical direction.

The connection device 23 is advantageously designed so that it allows

movement in a horizontal plane at the same time as it takes up load in the vertical direction. This design has a sound-damping effect between the wall units 12 which stand one on another. In Fig. 2, a circular cylinder 28 is shown, which is arranged rollably in the receiving members 25 with one receiving surface shaped like a groove.

The contact surface 22 for the connection device 23 is positioned in a uniform manner on each wall element 1 according to the invention, assembly work then being made easier. The wall elements 1 according to the invention are therefore advantageously bearing but can also constitute inner walls in a building, both bearing and non-bearing.

Fig. 3 shows parts of two wall elements 1 according to the invention in section. The figure shows the area of the connection device 23. This connection device is made so as to be sound-damping, which is described in said concurrent Swedish patent application.

A solid wood joist floor element 27 is arranged at the lower end 5 of the upper wall element 1. The solid wood joist floor element 27 consists of timber standing on end which is glued or nailed, forming a floor element. This joist floor element 27 is also moisture-buffering and heat-storing, which means that the properties of the wall element 1 are complemented for the indoor environment by means of the floor element. This affords significant advantages in terms of energy and power, for example by virtue of the fact that ventilation can be reduced during the time when the inner space formed by the walls and the floor elements is not being used.

A supporting beam 31 has been screwed by means of screws to the upper wall element 1 at its lower end 5. This supporting beam 31 supports the floor element 29, which is fixed to the supporting beam 31 by means of screws (not shown). A securing strip 35 has been screwed by means of screws to the lower wall element 1 at its upper end 3. This securing strip 35 secures a light false ceiling 37. Experiments have shown that great assembly advantages are achieved when the false ceiling 37 is attached to the securing strip 35 according to the invention. The invention means that, after joining one box unit 15 together with another on a building site, where a floor element 29 has already been mounted on the box unit 15 at the factory, the light false ceiling 37 can be suspended simply on the securing strip 35 by means of screws (not shown). This also affords great advantages as far as the prevention of impact sound is concerned, because the false ceiling 37 is connected to the wall unit 12 which does not generate any sound. This fact is readily apparent as the wall units 12 on the storey above cannot transmit sound to a wall unit 12' located below (see Fig. 5), to which the false ceiling

is connected.

Insulation 30 is arranged between the false ceiling 37 and the floor element 29. The cross section of the gap-shaped channels 13 can be seen clearly in Fig. 3. The vertical extent of the channels 13 is defined by the distance between the beams 11, and the gap width of the channels 13 is defined by the dimension of the beams 11 in their cross section in the horizontal direction.

Further insulation 39 is arranged against the outwardly facing side of the wall element 1, that is to say between the wall element 1 according to the invention and an outer panelling element 41, such as vertical or horizontal boarding, plaster etc. This adds to the insulating capacity of a building according to the invention. The outer insulation 39 is attached to the wall units 12 by means of attachment devices 43 which also comprise an attachment surface 44 for attachment of the outer panelling element 41. The outer insulation 39 is arranged on the outer side (not shown) of a building. In this way, extra wooden constructions, the sole function of which is to hold outer insulation in place, are avoided. The cold bridges such a construction involves are thus also avoided. This in turn means that a smaller amount of insulation is required in order to achieve corresponding insulating capacity.

The bearing wall elements 1 standing one on another can support heavy insulation. This type of insulation has many advantages in comparison with the light type. The light insulation is today used in wooden constructions, such as walls made of wood, on account of the lack of bearing capacity of these constructions. The invention therefore means that heavy outer insulation can be applied to wall elements 1 made of wood. This can be done owing to the fact that the wall elements 1 are not prone to deformation due to variations in load and moisture. Inner panelling elements 46 can be applied inside the building. This can be effected, if so desired, against the wall elements 1 where these are visible from inside, for example in an apartment or in a stairwell. The panelling element 46 is arranged at a distance from the wall elements 1 according to the invention by means of glued-on distance elements 47. In this connection, an insulating effect is also achieved by means of a gap 48 formed in this way.

Fig. 4a shows diagrammatically a construction method for positioning box units 15 according to the invention on and next to one another in a building. One box unit 15 can be lifted onto another by a crane (not shown). Connection devices (23, see Fig. 2) guide the box unit 15 into place. The box units 15 can be produced at the factory and transported to the building site by, for example, lorry.

Fig. 4b shows diagrammatically a construction method for positioning a wall, such as a wall unit 12, consisting of wall elements 1 according to the invention. For the sake of clarity, only a part of the building is shown. The wall elements 1 are connected to a base 49, such as a foundation. Other procedures can of course be used, with supplementary stages. In Fig. 4b, it can be seen that some wall elements 1 form inner walls and other wall elements 1 form outer walls.

The wall elements 1 are placed one on another via connection devices 23 by means of a crane, after which joist floors 27, insulation 40 (see Fig. 3) and false ceilings 37 (see Fig. 3) are mounted within the area of the transition between the floors of the building. Another row of wall units 12 is then erected on the previously connected wall units 12' (see Fig. 5).

Buildings made of wood can be constructed with up to five storeys according to these construction methods or procedures described in Fig. 4a and Fig. 4b. The roof of the building is then mounted in a conventional manner. Then the outer insulation 39 is mounted by means of attachment devices 43 according to the invention, and finally said outer panelling elements 41 are mounted against the attachment surfaces 44 (see Fig. 3) of these devices.

Fig. 5 shows diagrammatically a part of a corner 50 of a building in perspective, which building comprises wall elements 1 according to the invention. For the sake of clarity, only certain structural parts are illustrated, at the same time as the wall units 12, 12' are illustrated with a distance between them in the vertical direction in order to illustrate one type of connection device 23. The connection devices 23 bring about a connection between an upper wall element 1 and a lower wall element 1.

Fig. 5 shows the building diagrammatically, seen from inside. The wall units 12, 12' consist of wall elements 1, which wall units are mounted next to and on one another. The wall elements 1 are bolted to one another by means of bolts (not shown) at the factory. The wall units 12, 12' are bolted to one another on the building site by means of other bolts (not shown). A join 61 is shown diagrammatically.

Connection devices 23 are arranged between two wall units 12, 12' standing one on the other.

The connection device 23 shown here is described in greater detail in the abovementioned concurrent Swedish patent application. The distribution of connection devices 23 can be more sparse the higher up a building they are located, because the static loads then decrease. This is visible in the figure according to arrows A and B. The position of the joist floor element

27 is shown by broken lines. Strips 53 made of insulating material are arranged between the connection devices 23 and the wall elements 1 for thermal insulation. Only one strip 53 is illustrated.

The connection device 23 achieves the effect that the transverse force and the moment cannot be transmitted from one wall unit 12 to another. On the other hand, considerable static forces can be transmitted vertically in the longitudinal direction of the wall elements 1. The connection device 23 is space-saving, environmentally friendly and easy to handle.

A cube 55 of hard wood is positioned between the receiving members 25. These can be made of pressed wood, such as aspen. They must, however, be dimensioned so that the local reactions in the receiving members 25 and in the cube are such that transverse forces and moments cannot be transmitted from one wall unit 12, in which the sound is propagated, to another wall unit 12' located below or above the wall unit in which the sound has been generated. This is achieved by virtue of the fact that the receiving members 25 of the connection device 23 are made of pressed wood, which is elastic in the direction which is horizontal and transverse to the plane of the wall element, and by virtue of the fact that the receiving members 25 have a thickness which essentially corresponds to the transverse dimension of the cube 55.

In the figure, connection devices 23 made of wood are used, but these can nevertheless be made of other materials which allow movement in a horizontal plane at the same time as vertical forces can be taken up. The connection devices 23 are designed to take up static loads vertically at the same time as they allow movement of the wall units 12, 12' in the horizontal direction. The sound propagation direction in a wall unit 12 goes from one storey to another. A field quantity, such as said transverse forces and said moments, arises at right angles to the sound propagation direction and in the direction along a normal to the plane of the wall unit 12.

The connection device 23 therefore achieves the effect that the transverse force and the moment cannot be transmitted from one wall unit 12 to another. On the other hand, considerable static forces can be transmitted vertically in the longitudinal direction of the panels 7, 9.

The connection devices 23 must, however, be dimensioned so that the local reactions in the receiving members 25 and in the cube 55 are such that said transverse forces and said moments are not transmitted from one wall unit 12, in which the sound has been generated, to the other wall unit 12'. This is suitably achieved, when the connection device 23 is made of wood, by virtue of the fact that the receiving members 25 have a thickness which

essentially corresponds to the transverse dimension of the cube 55.

Fig. 6 shows diagrammatically a wall element 1 according to a second embodiment complete with connection devices 23 made of wood as shown in Fig. 5. In this embodiment, two gap-shaped essentially airtight channels 13 are produced. A central intermediate wooden panel 60 is arranged between the panels 7, 9, which also results in a stable wall element 1. A receiving member 25 made of steel can be arranged on the contact surface 22 at the lower end 5 of the wall element.

For the external action of wind forces on constructions of full height, a building which consists of wooden elements according to the invention is suitably provided with metal bracing (not shown).

Patent Claims

1. Bearing wall element made of wood with an upper and a lower end (3, 5), which wall element (1) consists of joined together wooden elements (2) standing vertically with their grain direction and forming at least a first and a second panel (7, 9) with a side plane, which panels are interconnected by means of horizontal beams (11) extending along the side plane of the panel at a distance from one another in the vertical direction, characterized in that the wooden elements (2) have exposed end wood (10) at the upper and lower ends (3, 5) of the wall elements (1).

2. Wall element according to Claim 1, characterized in that the space between the panels (7, 9) and the beams (11) forms an essentially gap-shaped airtight channel (13) in order to bring about an air gap with stationary air.

3. Wall element according to Claim 1 or 2, characterized in that the distance between the panels (7, 9) is 10-50 mm, preferably 22-40 mm, and/or half the thickness of the panel, and in that the distance between the beams (11) is 200-500 mm, preferably 250-350 mm.

4. Wall element according to any one of the preceding claims, characterized in that the panels (7, 9) have smooth surfaces (16) and/or in that the mutually facing side planes of the panels (7, 9) are covered with a heat-reflecting material (r).

5. Wall element according to any one of the preceding claims, characterized in that each panel (7, 9) has an upper and/or a lower end edge (19, 20) which forms at least one contact surface (22) for a sound-insulating connection device (23) which brings about guidance of one wall element (1) in relation to another during assembly and also acts in a self-centring manner after assembly.

6. Wall element according to any one of the preceding claims, characterized in that the wall elements (1) constitute wall units (12, 12') in a building with more than two storeys, in which outer walls and/or inner walls consist of wall units (12, 12') arranged next to one another and standing one on another, a sound-insulating connection device (23) being arranged at the transition between an upper and a lower wall unit (12, 12'), which connection device (23) brings about a connection between the upper and lower wall elements (1) at the same time as the connection device (23) allows movement in a horizontal direction transverse to the extent of the panels (7, 9) and also takes up load in the vertical direction in extension of the panels (7, 9).

7. Wall element according to any one of the preceding claims, characterized in that, within the area of the transition between two wall elements (1) standing one on the other, light false ceilings (37) and bearing solid wood joist floor elements (27) are connected at a distance from one another in the vertical direction to the upper and, respectively, lower end (3, 5) of said wall elements (1) in order to simplify the mounting of box units (15).

8. Wall element according to any one of the preceding claims, characterized in that outer insulation (39) is arranged on the outer side of a building constructed from wall elements (1) by means of attachment devices (43) designed to receive an outer panelling element (41).

9. Wall element according to any one of the preceding claims, characterized in that the wall elements (1) which are visible from inside the building are provided with inner panelling elements (46) at a distance from said wall elements (1) in order to bring about a gap (48) with stationary air.

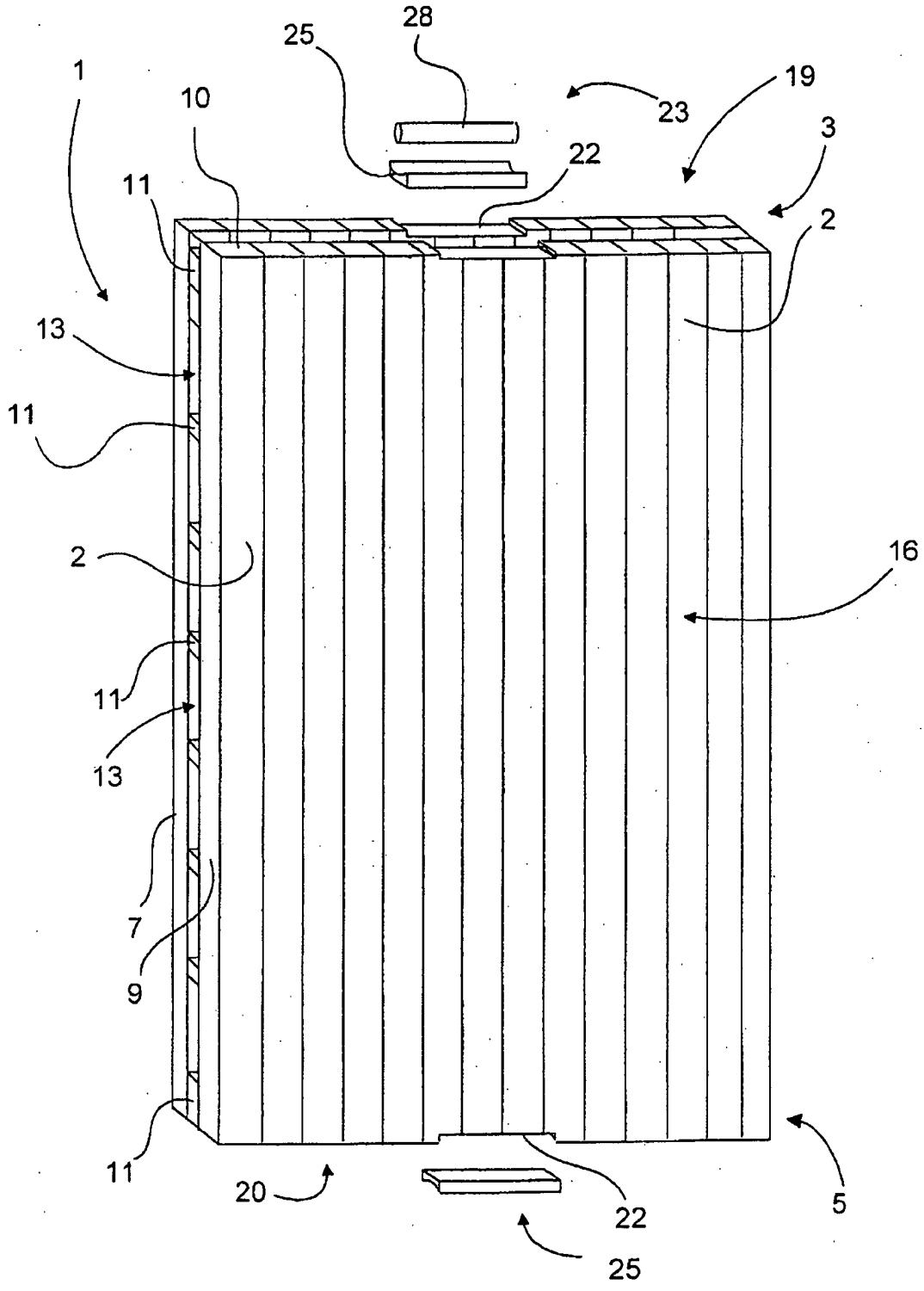

Fig. 1

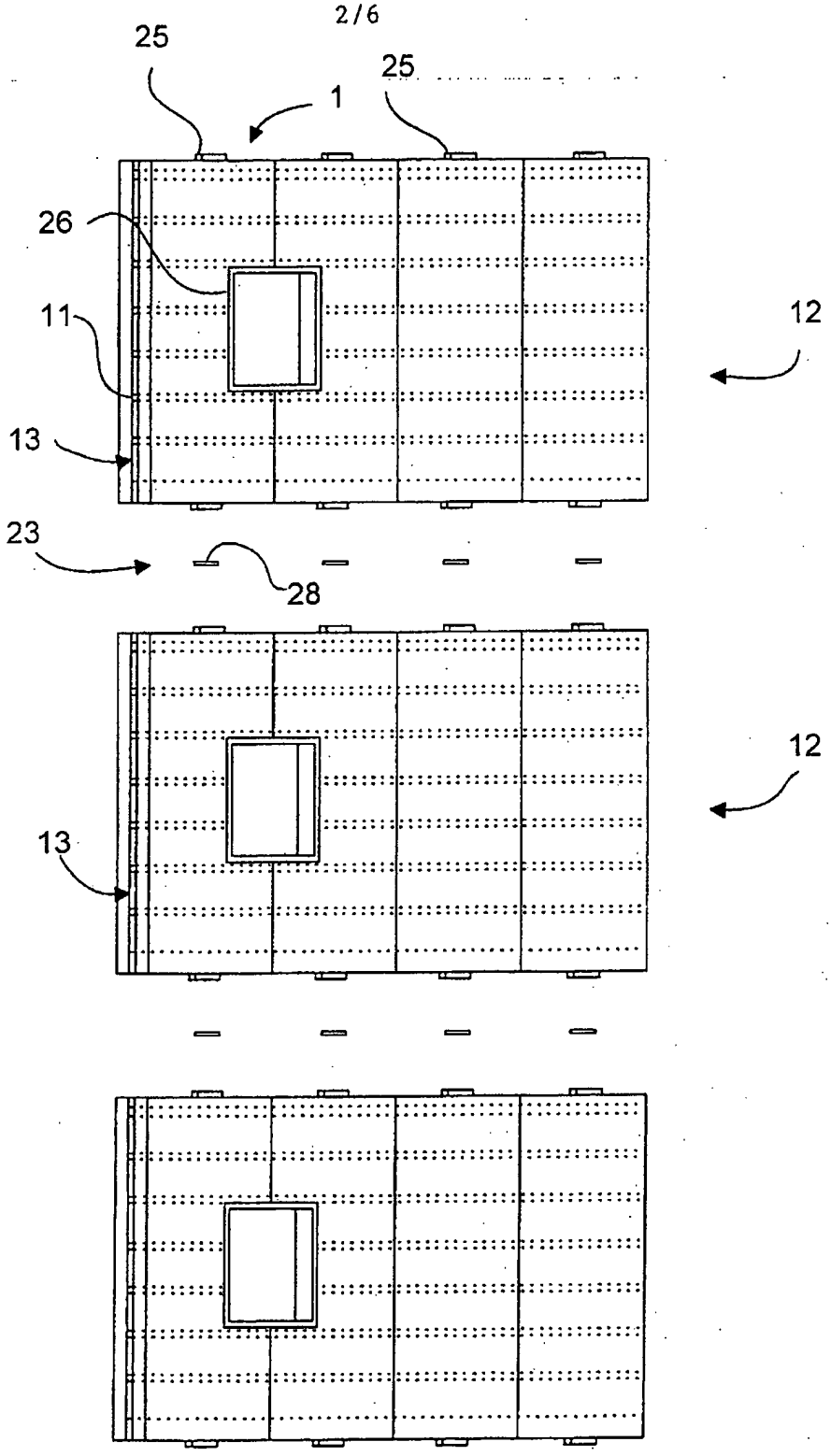

Fig. 2

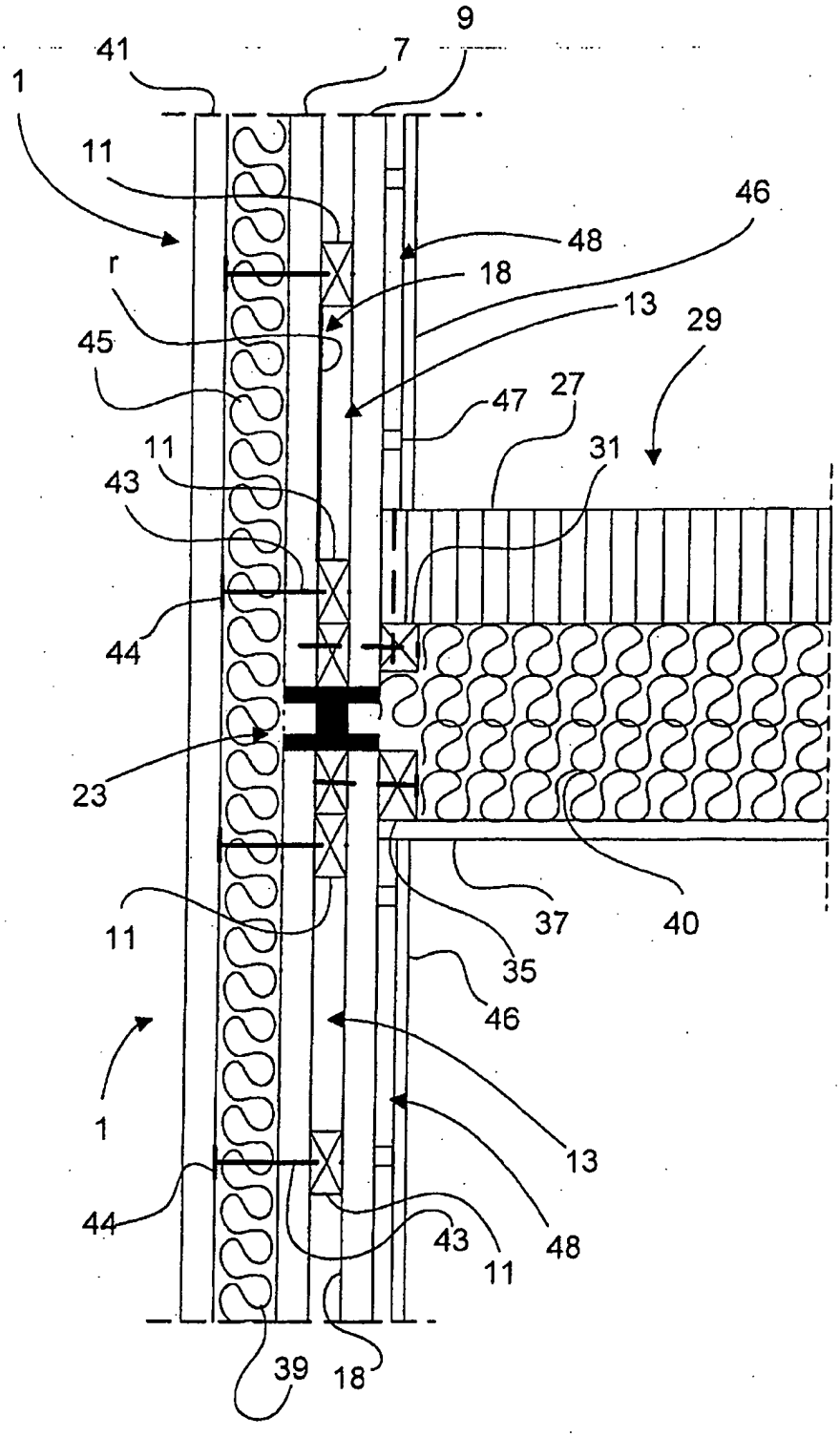
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Fig. 3

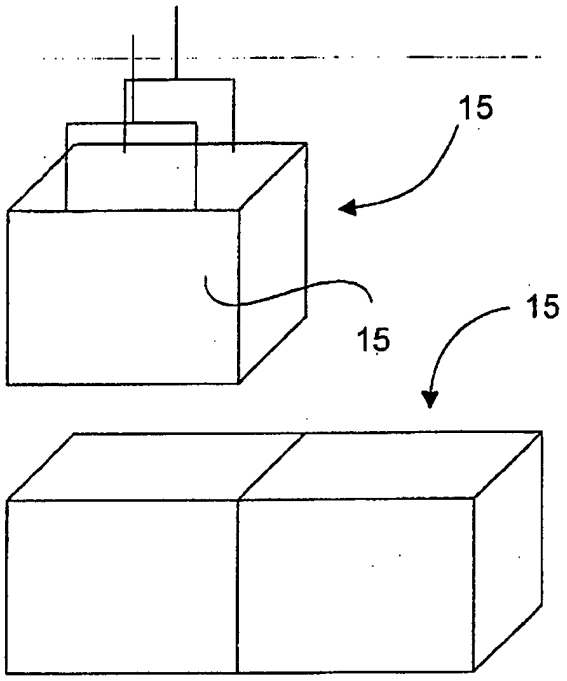

Fig. 4a

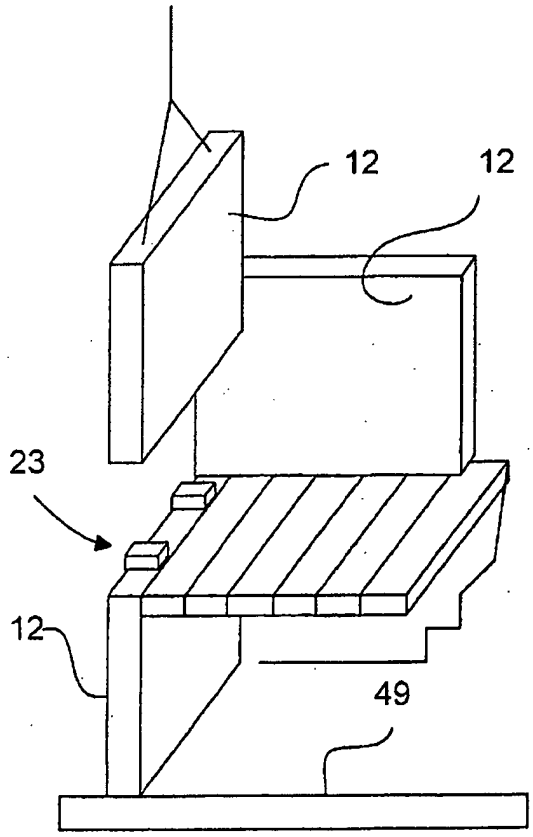

Fig. 4b

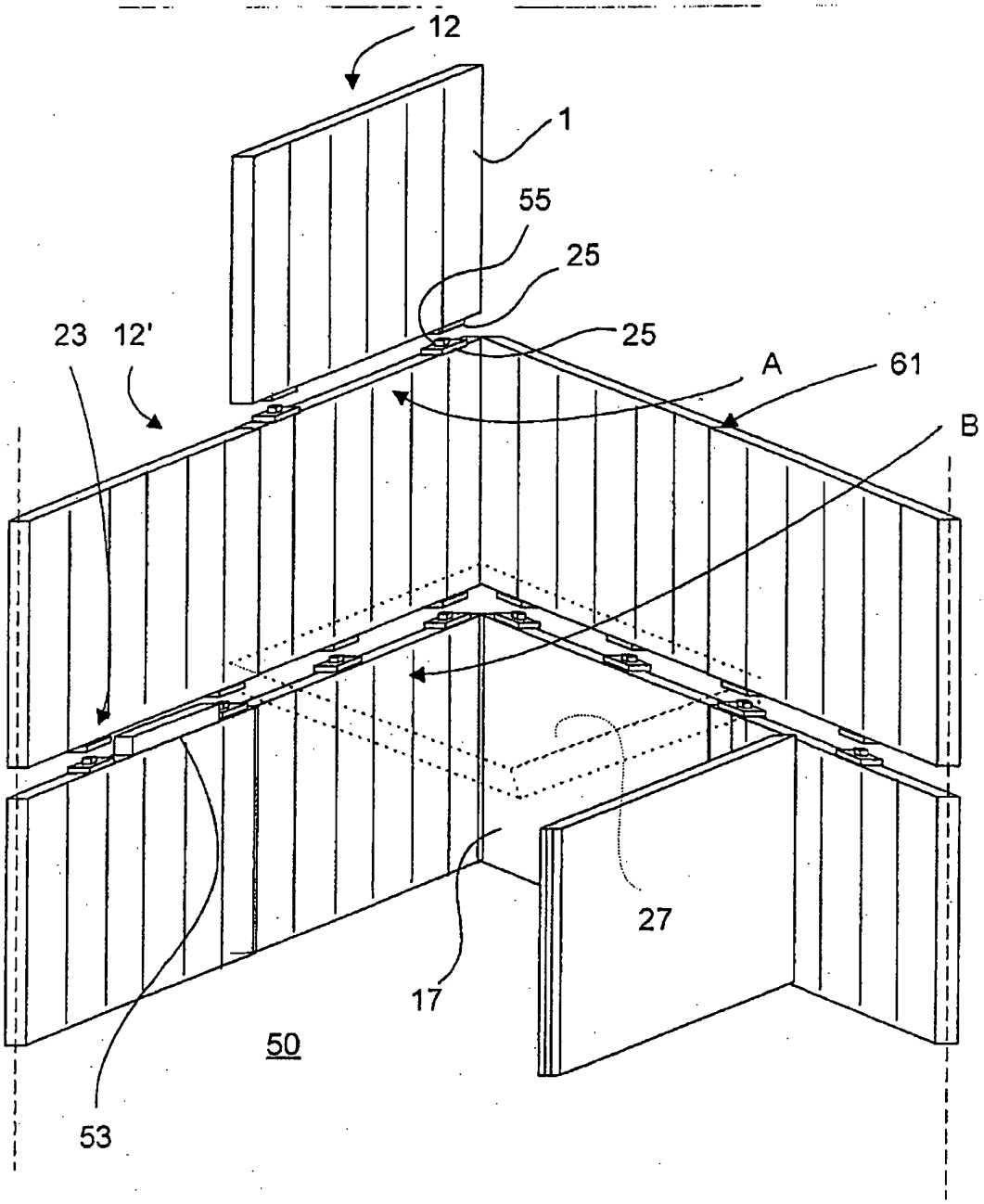

Fig. 5

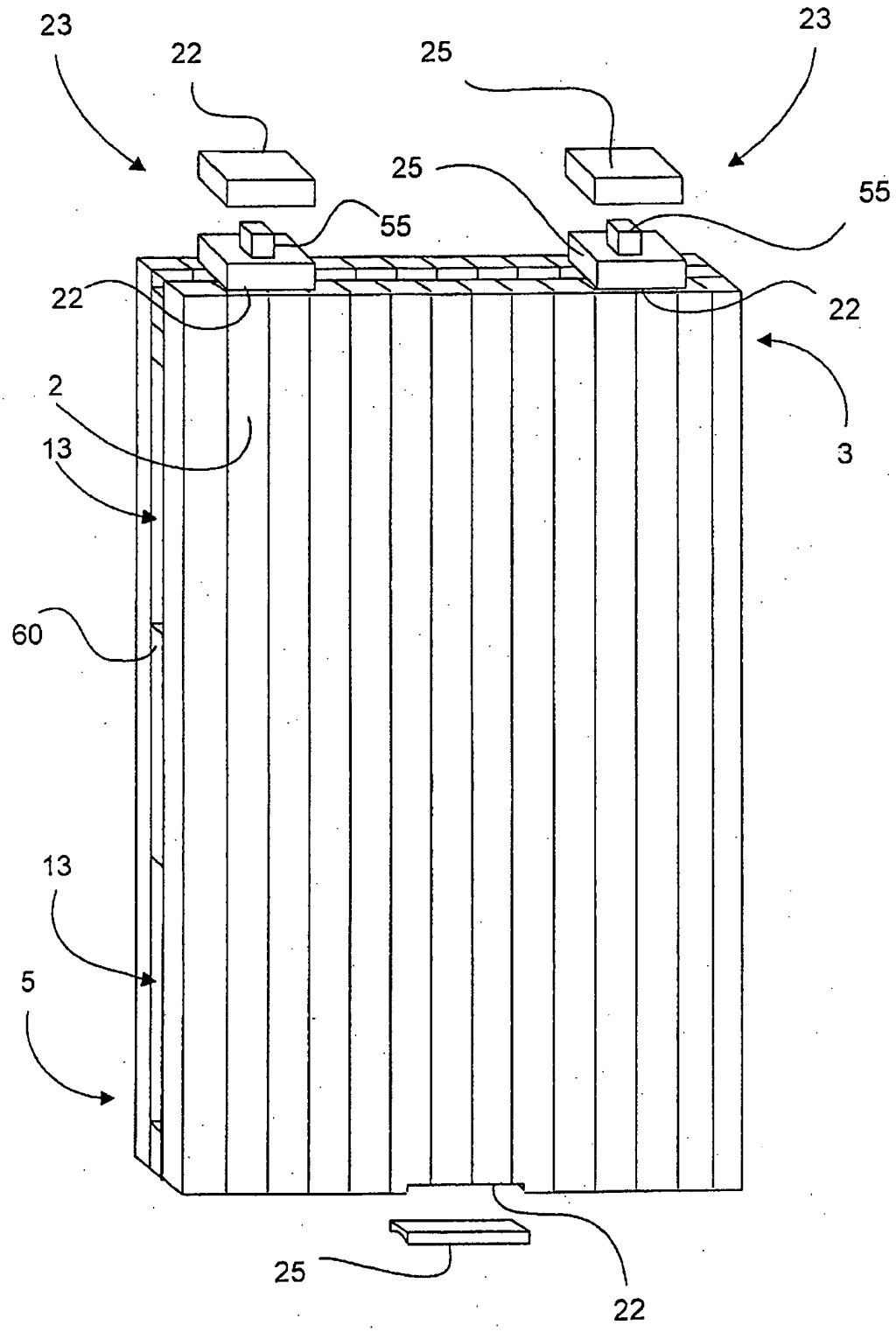

Fig. 6